CLAIMS LISTING

Claims 1 – 8 (Cancelled)

Claim 9. (Currently amended) A dual optical system, comprising:

a first optical subsystem, comprising a first ~~set~~ plurality of lenses, wherein, a portion of the first ~~set~~ plurality of lenses comprise cut-out sub-apertures and remaining apertures; and

a second optical subsystem, comprising a second ~~set~~ plurality of lenses; wherein, a portion of the second set of lenses are positioned within the cut-out sub-apertures of the first set of lenses,

wherein, the first optical subsystem transmits a first band of optical wavelengths through the remaining apertures, and the second optical subsystem transmits a second band of optical wavelengths not transmitted by the first optical subsystem.

Claim 10. (Currently amended) The dual optical system of Claim 9, wherein the first optical subsystem ~~transmits at least a first band of optical wavelengths and the second optical subsystem transmits at least a second band of optical wavelengths~~ and the second optical subsystem are refractive.

Claim 11. (Original) The dual optical system of Claim 10, wherein the first set of lenses, the second set of lenses, and the sub-apertures are circular.

Claim 12. (Original) The dual optical system of Claim 11, wherein a portion of the first set of lenses and a portion of the second set of lenses are disposed along a common optical axis.

Claim 13. (Original) The dual optical system of claim 12, wherein the first optical subsystem is capable of producing a first image and the second optical subsystem is capable of producing a second image.

Claim 14. (Original) The dual optical system of claim 13, wherein the first optical subsystem comprises a first subsystem focus group, the second optical subsystem comprises a second subsystem focus group, and wherein the dual optical system further comprises a first focus mechanism, attached to and capable of moving the first and second sub-system focus groups.

Claim 15. (Original) The dual optical system of claim 14, wherein the first band of optical wavelengths is an infrared band, and the second band of optical wavelengths is a visible band.

Claim 16. (Original) The dual optical system of claim 10, wherein the first optical system comprises a first subsystem focus group, the second optical subsystem comprises a second subsystem focus group, and the dual optical system further comprises a first focus mechanism, attached to and capable of moving the first and second sub-system focus groups.

Claim 17. (Original) The dual optical system of claim 16, wherein the first band of optical wavelengths is an infrared band, and the second band of optical wavelengths is a visible band.

Claim 18. (Original) The dual optical system of Claim 9, further comprising:

a focus element, the focus element comprising:

a first lens, capable of refracting light of a first band of optical wavelengths, and having an aperture cut through it; and

a second lens, capable of refracting light of a second band of optical wavelengths, fixed in the aperture of the first lens; and

a focus mechanism, attached to the focus element, capable of moving the focus element.

Claim 19. (Original) The dual optical system of claim 18, wherein the first optical subsystem is capable of producing a first image formed of light from the first optical wavelength band, and the second optical subsystem is capable of producing a second image from light of the second optical wavelength band, and wherein motion of the focus element adjusts the focus of both the first image and second image.

Claim 20. (Original) The dual optical system of Claim 19, wherein the optical system is receptive of light along a common light path, and further comprising:

a first output light path;

a second output light path; and

a fold element, capable of directing a portion of light of the first optical band along a first output light path,

and wherein light of the second optical band exits along a second output light path.

Claim 21. (Original) The dual optical system of claim 20, wherein the first band of optical wavelengths is an infrared band, and the second band of optical wavelengths is a visible band.

Claim 22. (Original) The dual optical system of Claim 20, further comprising:

a first recording means, for recording the first image positioned in the first output path; and

a second recording means, for recording the second image positioned in the second output path.

Claim 23. (Original) The dual optical system of Claim 22, further comprising display means, for displaying the first image and/or the second image to an operator.

Claim 24. (Currently amended) The dual optical system of ~~any of c~~ Claim 23, wherein the first band of optical wavelengths is an infrared band, and the second band of optical wavelengths is a visible band.

Claim 25. (Currently amended) ~~The dual optical system of claim 9~~ A dual optical system, comprising:

a first optical subsystem, comprising a first set of lenses, wherein, a portion of the first set of lenses comprise cut-out sub-apertures; and

a second optical subsystem, comprising a second set of lenses; wherein, a portion of the second set of lenses are positioned within the sub-apertures of the first set of lenses, wherein

the first optical subsystem further comprises a first variator group and a first compensator group, and

wherein the second optical subsystem further comprises a second variator group in contact with the first variator group and a second compensator group in contact with the first compensator group, and

wherein the dual optical system further comprises a zoom mechanism, capable of moving the first and second variator groups and the first and second compensator groups.

Claims 26 – 27. (Cancelled)

Claim 28. (Original) A dual band optical system, comprising:

a first imaging means, receptive of light of a first wavelength band, for forming a first image, and having a first annular aperture;

a second imaging means, receptive of light of a second wavelength band, for forming a second image, and having a second aperture, wherein the second aperture is contained within the first aperture; and

a focusing means, for adjusting focus of the first image and the second image, simultaneously.

Claim 29. (Original) A dual band lens, having a visible optical path and an infrared optical path, comprising:

a dual-band focus group, comprising

an annular first infrared lens element having an inner radius, and

a circular first visible lens element, located within the inner radius of the annular infrared lens element;

a fixed infrared imaging group, comprising a plurality of fixed infrared lens elements; and

a fixed visible imaging group, comprising a plurality of fixed visible lens elements;

wherein, the dual band focus group and the fixed infrared imaging group are placed along the infrared optical path, and wherein the dual and focus group and the fixed visible imaging group are placed along the visible optical path.

Claim 30. (Original) The dual band lens of Claim 29, wherein a portion of the plurality of fixed infrared lens elements comprise cut-out sub-apertures, and wherein a portion of the visible optical path passes through the cut out sub-apertures.

Claim 31. (Currently amended) ~~The dual band lens of Claim 30,~~ A dual band lens, having a visible optical path and an infrared optical path, comprising:

a dual-band focus group, comprising

an annular first infrared lens element having an inner radius, and

a circular first visible lens element, located within the inner radius of the annular infrared lens element;

a fixed infrared imaging group, comprising a plurality of fixed infrared lens elements; and

a fixed visible imaging group, comprising a plurality of fixed visible lens elements;

wherein, the dual band focus group and the fixed infrared imaging group are placed along the infrared optical path, and wherein the dual and

focus group and the fixed visible imaging group are placed along the visible optical path,

wherein a portion of the plurality of fixed infrared lens elements comprise cut-out sub-apertures, and wherein a portion of the visible optical path passes through the cut out sub-apertures,

further comprising:

a dual-band variator group, comprising an infrared variator element positioned along the infrared optical path and a visible variator element positioned along the visible optical path, in contact with the infrared variator element;

a dual-band compensator group, comprising an infrared compenstator element positioned along the infrared optical path and a visible compensator element positioned along the visible optical path, in contact with the infrared compensator element; and

a zoom mechanism, in contact with the dual band variator group and the dual band compensator group, capable of zooming the dual band lens.

Claim 32. (New) The dual lens of Claim 31, wherein,

the dual-band focus group first infrared lens element has a first radius of curvature of approximately 73 mm, a second radius of curvature of approximately 2847 mm, a thickness of approximately 6 mm, a diameter of approximately 52 mm, and is formed of AMTIR4;

the dual-band focus group first visible lens element is a cemented doublet, having a first radius of curvature of approximately 0.95 inches, a second radius of approximately .49 inches a first thickness of approximately 10.04 inches of F2, a second thickness of approximately 0.2 inches of BK7, and a diameter of approximately 0.63 inches;

the infrared variator element has a first radius of curvature of approximately -46 mm, a second radius of approximately 53 mm, a thickness of approximately 2.4 mm, a diameter of approximately 30 mm and is formed of AMTIR4;

the visible variator element is a cemented doublet, having a first radius of curvature of approximately -0.73 inches, a second radius of approximately 0.04 inches a first thickness of approximately 0.06 inches of SF6, a second thickness of approximately 0.04 inches of LAKN12, and a diameter of approximately 0.47 inches;

the infrared compensator element has a first radius of curvature of approximately 46 mm, a second radius of approximately 214 mm, a thickness of approximately 4 mm, a diameter of approximately 42 mm, and is formed of AMTIR4;

the visible compensator element is a cemented doublet, having a first radius of curvature of approximately 0.98 inches, a second radius of approximately 0.34 inches a first thickness of approximately 0.04 inches of LAF2, a second thickness of approximately 0.16 inches of SK4, and a diameter of approximately 0.39 inches;

the plurality of fixed infrared lens elements comprises:

a first lens, having a first radius of curvature of approximately 51 mm, a second radius of approximately 669 mm, a thickness of approximately 4 mm, a diameter of approximately 37 mm, formed of AMTIR4; and

a second lens, having a first radius of curvature of approximately infinity, a second radius of approximately infinity, a thickness of approximately 1 mm, a diameter of approximately 12 mm, formed of GE_LONG; and,

the plurality of fixed visible lens elements comprises:

a first lens, having a first radius of curvature of approximately 1.68 inches, a second radius of approximately 0.59 inches, a thickness of approximately .08 inches, a diameter of approximately 0.47 inches, formed of SF57; and

a second lens, having a first radius of curvature of approximately 0.72 inches, a second radius of approximately -0.7 inches, a thickness of approximately 0.16 inches, a diameter of approximately 0.47 inches, formed of LAKN12.

Claim 33. (New) The dual lens of Claim 25, wherein,

the dual-band focus group first infrared lens element has a first radius of curvature of approximately 73 mm, a second radius of curvature of approximately 2847 mm, a thickness of approximately 6 mm, a diameter of approximately 52 mm, and is formed of AMTIR4;

the dual-band focus group first visible lens element is a cemented doublet, having a first radius of curvature of approximately 0.95 inches, a second radius of approximately .49 inches a first thickness of approximately 10.04 inches of F2, a second thickness of approximately 0.2 inches of BK7, and a diameter of approximately 0.63 inches;

the infrared variator element has a first radius of curvature of approximately -46 mm, a second radius of approximately 53 mm, a thickness of approximately 2.4 mm, a diameter of approximately 30 mm and is formed of AMTIR4;

the visible variator element is a cemented doublet, having a first radius of curvature of approximately -0.73 inches, a second radius of approximately 0.04 inches a first thickness of approximately 0.06 inches of SF6, a second thickness of approximately 0.04 inches of LAKN12, and a diameter of approximately 0.47 inches;

the infrared compensator element has a first radius of curvature of approximately 46 mm, a second radius of approximately 214 mm, a thickness of approximately 4 mm, a diameter of approximately 42 mm, and is formed of AMTIR4;

the visible compensator element is a cemented doublet, having a first radius of curvature of approximately 0.98 inches, a second radius of approximately 0.34 inches a first thickness of approximately 0.04 inches of LAF2, a second thickness of approximately 0.16 inches of SK4, and a diameter of approximately 0.39 inches;

the plurality of fixed infrared lens elements comprises:

a first lens, having a first radius of curvature of approximately 51 mm, a second radius of approximately 669 mm, a thickness of approximately 4 mm, a diameter of approximately 37 mm, formed of AMTIR4; and

a second lens, having a first radius of curvature of approximately infinity, a second radius of approximately infinity, a thickness of approximately 1 mm, a diameter of approximately 12 mm, formed of GE_LONG;

the plurality of fixed visible lens elements comprises:

a first lens, having a first radius of curvature of approximately 1.68 inches, a second radius of approximately 0.59 inches, a thickness of approximately .08 inches, a diameter of approximately 0.47 inches, formed of SF57; and

a second lens, having a first radius of curvature of approximately 0.72 inches, a second radius of approximately -0.7 inches, a thickness of approximately 0.16 inches, a diameter of approximately 0.47 inches, formed of LAKN12.

Claim 34. (New) The dual optical system of Claim 21, wherein,

the first lens of the focus element has a first radius of curvature of approximately 63 mm, a second radius of curvature of approximately 750 mm, a thickness of approximately 6 mm, a diameter of approximately 51 mm, and is formed of AMTIR4;

the second lens of the focus group, has a first radius of curvature of approximately 37 mm, a second radius of approximately 389 mm a thickness of approximately 1.4, a diameter of approximately 12 mm, and is formed of F2;

the first set of lenses comprises:

a first infrared imaging lens, having a first radius of curvature of approximately -49 mm, a second radius of approximately -86 mm, a thickness of approximately 4.5 mm, a diameter of approximately 42 mm, formed of AMTIR4; and

a second infrared imaging lens, having a first radius of curvature of approximately 22 mm, a second radius of approximately 23 mm, a thickness of approximately 5 mm, a diameter of approximately 22 mm, formed of AMTIR4; and,

a third infrared imaging lens, having a first radius of curvature of approximately infinity, a second radius of approximately infinity, a thickness of approximately 1 mm, a diameter of approximately 12 mm, formed of GE_LONG;

the second set of lenses comprises:

a first visible imaging lens, having a first radius of curvature of approximately 37 mm, a second radius of approximately 389 mm inches, a thickness of approximately 0.7 mm, a diameter of approximately 9 mm, formed of FK5;

a second visible imaging lens, having a first radius of curvature of approximately 0.72 inches, a second radius of approximately -0.7 inches, a thickness of approximately 0.16

inches, a diameter of approximately 0.47 inches, formed of LAKN12;

a third visible imaging lens, being a cemented doublet, having a first radius of curvature of approximately –933 mm, a second radius of approximately -8.6 mm, a first thickness of approximately 3.4 m of SK5, a second thickness of approximately 3.4 mm of SF11, and a diameter of approximately 12 mm; and,

a fourth visible imaging lens, having a first radius of curvature of approximately 47 mm, a second radius of approximately –22 mm, a thickness of approximately 3 mm, a diameter of approximately 12 mm, formed of BK7.